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cc: F.D. Dryden/File

Project #FS155
Austin, MN
February 21, 1997

W. DION - CO
M. SLETTÉ - CO
D. SCHEIDT - CO
T. HADDEN - OKC
D. WHITE - OKC
R. ALBERS - OKC

RE: Browning tests: Heat and Control oven: conversation with Doug Kozenski and James Padilla

Recommendations:

1. Reduce fat to 25% to 28%
2. Overmix meat 10 minutes. (may change texture)
3. Use STPP - may change texture (with 2 minute re-mix).
4. Test radiant tube at Heat & Control in tandem with impingement oven.
5. Test Different Sugars:
 - a. Fructose - Brown color
 - b. Sucrose - Tan color
 - c. Dextrose - Golden Tan color
 - d. Corn Syrup Solids - Reddish Brown color
 - e. Brown Sugar

6. Initial Impingement Oven Parameters

	<u>Infeed</u>	<u>Nozzle Height - 2</u>	<u>Exit</u>
Top Fan	75		75
Temp.	400		500
Humidity	40		40
Bottom Fan	70		70

Dwell @ 1.5

If more browning is needed, increase temperature to 450°F.

Infeed temp could go to 500°F and Exit temp to 550°F. maximum.



pjh (11756)

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U-06863**

PTO-004134

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WB-000080

Uniterm Operating Conditions

General Notes

2/25/97
Phyman

- 1) Testing and evaluation showed that we obtained the best color with Top air in the first zone and bottom air in the last 2 zones.
- 2) To get good color on sides, we had to only put 4 pieces wide on Uniterm belt. Some pieces were up to 8" wide at widest point.
- 3) We were able to load the belt on 10" centers.
- 4) Uniterm put a new belt on unit that is heavier material and $\frac{1}{2}$ " wide. This should help give better color on bottom as was shown from testing.
- 5) We observed darker product on the side closest to the fan. Uniterm said they would adjust the angle of the baffle to improve uniformity from side to side.
- 6) Final testing showed that the first zone temperature dropped when product was put into it. Uniterm said that will be corrected when all heaters are hooked up.

PTO-004135

Unitherm Operating Conditions

2/24/97

1st Run

Product

44 Mesquite Smoked Breast

A) Smoke Drench
4 Wide

Solution: 1 Part Super
1 Part 10DC
1 Part Water

Time 45 sec

B) Unitherm Settings

1) Speed setting 63

Dwell Time 10 Min 45-5

2) Temperature Settings

Zone 1 572°F

Top Air

Zone 2 670°F

Bottom Air

Zone 3 670°F

Bottom Air

C) Average Treatment Loss 2.94%

D) Evaluation

Color close to target

Piece on back side on target color

Bottom too dark - Should be better with new belt

WB-000081

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PTO-004136

Unitherm Operating Conditions

2/25/97

Product # 5-2934 Breast

A) Sink Drench
4 Min

Solution: 2 Part Sink 10
1 Part Water

Time: 20 sec (4 zones on)

B) Unitherm Setting ~~22~~ Dwell Time 9 min 30 sec

- 1) Speed setting 22
2) Temperature setting

Zone 1	570°F	Top Air
Zone 2	670°F	Bottom Air
Zone 3	670°F	Bottom Air

C) Average treatment wt loss 3.0%

D) Evaluation

Slower speed gave slightly darker color
Very uniform attractive color
Fan side piece is darker

PTO-004137

WB-000082

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Unitherm Operating Conditions

2/24/97

Ph. I Wm.

Product 302 - 304 Hickory

A) Smoke Drench
4 Wide

Solution: 2 Parts Smoke 100
1 Part water

Time 45 sec

B). Unitherm Settings

Dwell 9 Min 30 Sec

- 1) Speed setting 72
- 2) Temperature Setting

Zone 1 570°F

Top Air

Zone 2 670°F

Bottom Air

Zone 3 670°F

Bottom Air

C) Average treatment Loss

~~2.8%~~ 2.8%

D). Evaluation:

Color little darker than w/
Back side pieces darker

PTO-004138

WB-000083

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2/25/97

Uniterm Operating Conditions

Product 204 and 304 *

A) Smoke Drench Solution 2 Parts Smoke 100
1 Part water

B) Uniterm Settings

1) Speed setting 90 Dwell time 7 min 48 sec

2) Temperature settings:

To be determined

Air flow has changed

C) Average treatment wt loss 1.7%

D) Evaluation - Run 5 wide

Good color on top, sides too light

Poor uniformity

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WB-000084

* These tests were run the first day
with original air directions. Would need
to re-fit. settings with current air.

Unitherm Operating Conditions

2/24/97

Phil Weller

Product 76 Breast

A) Inside Drench
4 Wide

Solution: Maitose 1 Part
Water 1 Part

Time: 45 sec

B) Unitherm Settings

1) Speed setting: 72

Dwell Time 9 min 27.

2) Temperature Setting:

Zone 1 570°F Top Air

Zone 2 670°F Bottom Air

Zone 3 670°F Bottom Air

3) Average ~~treatment~~ Loss: 3.16%

4) Gave target color

Color more uniform than present sys.

Golden brown with black highlights

PTO-004140

WB-000085

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TO: Springfield Management (Jefferson St.)
 FROM: Tony Muller
 Date: February 11, 1997
 RE: DATA SUMMARY CONDUCTED AT UNITHERM ON THE RAPID FLOW OVEN

The following summarizes the data recorded on the last day (January 30, 1997) of testing at Unitherm on the rapid flow oven. Air flow through each of the zones that gave the best color uniformity from top to bottom within a piece and across the belt is as follows: ZONE 1:UP ZONE 2:DOWN ZONE 3:DOWN. Products located closest to the air fans were consistently darker which Dave Howard from Unitherm will address prior to oven installation.

PRODUCT CODE	TYPE	SMOKE PARAMETERS			OVEN SETTINGS				
		SMOKE	DILUTION	TIME	FREQ.	1	2	3	YD (HOT)
57934	HK	100	2:1	70s	76	570	670	670	97.48
57934	HK	100	2:1	70s	72	570	670	670	97.01
50204	HK	100	2:1	70s	72	570	670	670	97.13
		NOTE: COLOR OF FINISHED PRODUCT WAS CLOSE TO TARGET							
50302	HK	100	2:1	70s	72	570	670	670	98.02
		NOTE: COLOR LIGHTER THAN THE CONTROL							
50044	MQ	10DC	1:1	45s	72	570	670	670	97.24
50044	MQ	10DC	2:1*	45s	72	570	670	670	97.27
		NOTE: OVERALL, COLOR TOO LIGHT							
50044	MQ	10DC	2:1	45s	63	570	670	670	96.71
		NOTE: LIGHT SIDE OF THE TARGETED COLOR							
50044	MQ	10DC/SSP	1:1:1	45s	63	570	670	670	96.68
		NOTE: COLOR CLOSER TO TARGET, BOTTOM TOO DARK							
50044	MQ	10DC/SSP	1:1:1	45s	63	572	670	670	96.97
50044	MQ	10DC/SSP	1:1:1	45s	63	572	670	670	97.15
		NOTE: 1 ZONE CAPACITY IN OVEN, COLOR CLOSER TO TARGET							
50076	MAILLOSE	1:1	45s	72	572	670	670	96.84	
		NOTE: HIT TARGET COLOR							

WB-000086

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PTO-004141

FOOTNOTES

1. Hickory smoke was applied through the drench applicator designed to run simultaneously with the rapid flow oven. The drench applicator performed to our expectations. Mesquite smoke and maillose were hand dipped for 45 seconds due to time constraints.
2. Correlating times for frequency given on table.
76=9m 0s / 72=9m 30s/ 63=10m 45s
3. Oven temperatures are in degree Fahrenheit.
4. Hot cook yield is based upon the average of four pieces setting side by side when transported through the oven. Chilled cook yield was not determined due to logistics.

WB-000087

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PTO-004142

Proposed RWO Heat Cycle

<u>Time</u>	<u>DB</u>	<u>WB</u>	<u>% RH</u>
20	140	120	55
20	150	140	75
90	150	125 Wood Smoke	48
45	—	160	100
45	—	170	100
—	—	180 To IT	100

DAVE:

Please review proposed RWO heat cycle —
I think the first two steps & the step
after the smoke cycle are too high in
Humidity —

JW ATTACH: NC-THE CYCLE I'VE BEEN USING
ON THE SMALL C-81'S IN STARCH —
THE 1ST 4 ~~CYCLES~~ ^{STEPS} WOULD APPLY TO
THE RWO CYCLE FOR COMPARISON



PTO-004143

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MP 360.10

MH 6/6/97

SIMUL CURE 810 Heat process - 170°F internal temperature

TIME (Minutes)	DRY BULB °F	WET BULB °F	RH	SMOKE	DRAWS
30	150	110	28	OFF	Auto
30	150	120	40	OFF	Auto
120*	150	125	48	ON	Auto
120	160	140	57	OFF	Auto
60	170	150	59	OFF	Auto
60	0	175	100	OFF	Steam cool.
**	0	185	100	OFF	Steam cool.

* Start smoke 30 minutes into the cycle

** Steam cook / Drawers closed with supply fan on
to 170°F

30 150 X 170

30 150 X 175

90 150 X 170 w. SMC Art Goembel

30 160 X 170

160 ST. CL → 138-140° internal

170 ST. CL → 148-150° internal

PTO-004144

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UNITHERM FOOD SYSTEMS INC.
1108 WEST HARTFORD AVE.
PONCA CITY, OKLAHOMA 74601
TELEPHONE: 405-762-0197
FAX: 405-762-0199
E-MAIL: unitherm@pcok.com



A WORLD OF STAINLESS STEEL PRODUCTS

March 10, 1997

Mr. Bob Wood
JENNIE-O FOODS, INC.
2505 Willmar Ave. South West
Willmar, MN 56201

Via Fax # 320-231-7177

Dear Bob:

I was sorry that we were not able to make more immediate progress on Friday. I hope the following adequately reflects the project and our observations.

- 1) During the site visit and subsequent meeting, interest was expressed in developing a replacement for your current netting process. We believe that we have a solution for this. It would cost a budget price of \$78,000. If you are interested in pursuing this, we would ask that you look at your yearly cost of netting. This will determine the return on investment and whether the equipment is worth inventing. If you would wish to proceed, we will generate the legal paperwork that allows us to disclose the process. Please let us know.
- 2) Bag Stripper We acknowledge that you are keen to purchase this unit. Believe me, it was hard to walk away from the order.

If we are to move the blades to the side, it creates the following engineering problems: The resistance from the blades will make the product stall and the conveyor will not create the friction to drive it through. This can be resolved by putting a flight on the belt; however, the flight will then drive the product into the air inflator so that it becomes jammed. These are the initial problems. It might be that an indexing system works better.

The existing unit works well and costs \$38,000. However, Jeff's observation is correct, and the blade would be better placed on the sides. If we are to make this unit, the cost would be \$54,000. Delivery would be 16-20 weeks. We would need an adequate supply of product for testing, and would require your personnel to visit site here prior to delivery to agree performance.

U-02331

PTO-004145

Bob Wood

Page 2

March 10, 1997

3) We observed at Montevideo product being cut by hand into two pieces. We believe that a previous "chicken splitter" we have built will perform this job faster and more accurately. The unit would cost \$28,000.

4) We also noticed that slicing product was being "docked" prior to slicing, so that the slicing yield is nominally 90 percent. Press Towers would give a yield of 98 percent. This equipment is available for testing.

5) Aqua Flow You expressed interest in testing this unit at your facility. I can confirm that it will be available at the beginning of April. We would ask that you advise us of the foot print, weight, and volume per hour of product you would like to pasteurize. This will allow us to size a machine and quote you for it. By doing so, we are seeking to establish the criteria by which the process can succeed and develop into an order for UNITHERM.

6. We can confirm the following prices for your in-line smoking process:

A. Bag Stripper	\$ 38,000
B. Purge Removal	\$ 49,000
C. Smoke Dip	\$ 27,500
D. RapidFlow 3-zone	\$525,000
C.I.P., if desired	\$ 58,000
E. Impingement Chiller	\$210,000

You mentioned that the smoke line was unlikely to proceed in 1997. We are currently building lines at the moment, and would be happy to receive you as our guest to view the equipment. The offer remains to visit the U.K., where we could extend the visit to include your viewing four or five RapidFlow lines in operation, if this would help.

We did not discuss in any detail Radio Frequency Cooking. I did get the impression that your team may have been confused as to its acceptability in the food industry. R.F. is a dielectric energy, similar to microwave. R. F. has been widely used in the bakery industry in the U.S. for the last 10 years. What's new is the migration and innovation of this technology to meat.

Regards,



David Howard
President

DH557BW

U-02332

PTO-004146

UNITHERM Food Systems, Inc.
Cooking Trial Data

Date: 3/10/97

Test #	Belt Speed	Cook Time	Temperatures C.	Product: TURKEY BREAST w/ LET MARKS		Supplied By: <i>HAINVILLE</i>	Internal Temp. F.	R marks
				Start Weight	Cooked Weight			
#1	30.06	8.5 min.	350°	6.720	6.585	98%	38°F	
#2	23.04	10 min.	350°	7.395	7.225	97%		
#3	15.60	14 min.	350°	6.780	6.555	96%		
#4	20 min.	350°		6.570	6.295	95%		
#5	24 min.	350°		7.060	6.695	94%		
#6	28 min.	350°		6.945	6.515	93%		
NOTES								
#7		30 min.	350°	6.495	5.515	91%		
#8		32 min.	350°	6.635	5.985	90%		
#3								
#4								
#5								
#6								

U-01390

PTO-004147

UNITHERM FOOD SYSTEMS, INC.
1108 WEST HARTFORD AVE.
PONCA CITY, OKLAHOMA 74601
TELEPHONE: 405-762-0197
FAX: 405-762-0199
E-MAIL: unitherm@pcok.com



A WORLD OF STAINLESS STEEL PRODUCTS

FAX TRANSMITTAL

DATE: 3/11/97

TO: MARCUS

COMPANY: RAINVILLE FARMS

FAX NUMBER:

FROM: Jim WADE

TOTAL PAGES: 2

MESSAGE:

MARCUS -

PLEASE SEE PAGE 2
FOR YOUR COOK / WEIGHTS INFO. COPY OF MY ORIG.
- AS YOU CAN SEE, THE LONGER COOK
TIME CERTAINLY AFFECTS YIELDS...

- IF YOU WERE OPEN TO THE IDEA, A VERY
MILD SOLUTION OF MAICROSE - MIXED @ 5% OR
10% WOULD GIVE YOU A VERY NICE COLOR, AND
MUCH HIGHER YIELD. I DO, HOWEVER
RESPECT WHAT YOU ARE TRYING TO ACHIEVE.

I DO HOPE THE SAMPLES, WITH THIS
INFORMATION, DO GIVE YOU THE INFO YOU
WERE LOOKING FOR.

DID YOU LIKE WHAT YOU'VE SEEN?
PLEASE LET ME KNOW, AND THANKS FOR
YOUR OPPORTUNITY TO HELP -

U-01391

UNITHERM Food Systems, Inc.

Cooking Trial Data

Date: 1.5-30-97

Product:

UNITHERM Food Systems, Inc.							Date: 15-30-97
Cooking Trial Data							
Test #	Product:						Supplied By: FARMLAND Foods
	Belt Speed	Cook Time	Temperatures C.	Start Weight	Cooked Weight	Yield	
	Zone 1	Zone 2					Internal Temp. F.
#1	10 min	500	500	DRY	6 MINS		
#2	10 min	500	500	DRY	6 MINS		
#3	NO 3 - Stroke	only	6 MINS				
#4	do 4	10 min	DRY	to skin	Snap		
#5							
#6							
NOTES							
#1							
#2							
#3							
#4							
#5							
#6							

U-8203

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PTO-004154

UNITHERM FOOD SYSTEMS, INC.
1108 WEST HARTFORD AVE.
PONCA CITY, OKLAHOMA 74601
TELEPHONE: 405-762-0197
FAX: 405-762-0199
E-MAIL: unitherm@pcok.com



A WORLD OF STAINLESS STEEL PRODUCTS

June 2, 1997

Mr. Rick Denzel
Mr. Kent Gross
EXCEL CORP.
Ft. Branch, IN

Via Fax # 812-753-2014

Dear Sirs:

The settings for the RapidFlow are as follows:

Zone 1:	(Infeed)	Temperature	450° F.	Steam On
Zone 2:		Tempeature	650° F.	
Belt Speed:		1 minute	50 seconds	

The concentration to atomize - Corn Syrup and Caramel (or Mailose):

65 percent	Hot Water
30 percent	Corn Syrup
5 percent	Caramel or Mailose

Regards,

David Howard
President

DH624EC

U-00088

PTO-004155

UNITHERM Food Systems, Inc.

Cooking Trial Data

Date: 6-17-97

Test #	Belt Speed	Cook Time	Temperatures C.	Start Weight	Cooked Weight	Yield	Internal Temp. F.	Supplied By:	Remarks
								Jenny O'Sullivan	100% Emulsion (soaking) 24 P. P. Select pieces 24 P. P. Ready for sale
#1	36.01	16 min	5600 (0.50)						
#2	36.01	17 min	5190 (0.50)						
#3	36.01	16 min	5100 (0.50)	10.290	10.08				
#4	36.01	16 min	5100 (0.50)	9.265	9.230	9.040			
#5									
#6									

NOTES

#1

33% Suck 6290 H2C

#2

#3

#4

#5

#6

U-05699

PTO-004156